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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,228	11/07/2001	Deborah S. Schnur	I69.12-0507	6958

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KINNEY & LANGE, P.A.
THE KINNEY & LANGE BUILDING
312 SOUTH THIRD STREET
MINNEAPOLIS, MN 55415-1002

EXAMINER	
DOLAN, JENNIFER M	
ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 10/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/008,228	SCHNUR ET AL.	
	Examiner	Art Unit	
	Jennifer M. Dolan	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *13 August 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 8/13/02 have been approved by the Examiner. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 1 - 6 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,181,531 to Koshikawa et al.

Regarding claim 1, Koshikawa discloses a slider (110) for supporting a transducing head (152b) proximate a rotating disc, the slider comprising a slider body (figure 23), including a primary air bearing (surface in figure 23 except portion 152) and a secondary air bearing (152),

the slider body having a disc opposing face (figure 23, ABS) bounded by a leading edge (near 117) and a trailing edge (near 151) wherein the transducing head is located on the disc opposing face proximate the trailing edge and on the secondary air bearing (figure 23); and means (151a, 152a) for permitting vertical movement of the transducing head with respect to the slider body (column 15, lines 6 – 11). Because the second air bearing of Koshikawa is spring supported in the same manner as the claimed invention, it is implicit that the transducing head moves in response to the local disc surface topography to maintain head media spacing between the transducing head and the disc substantially constant as the slider flies over the disc.

Regarding claim 2, Koshikawa discloses that the means for permitting vertical movement of the transducing head is an interface (151 and 152) connecting the primary air bearing (including 151) to the secondary air bearing (152) (figure 24).

Regarding claim 3, Koshikawa discloses that the interface displaces the secondary air bearing vertically with respect to the primary air bearing (column 15, lines 9 – 11).

Regarding claim 4, Koshikawa discloses that the interface substantially surrounds the secondary air bearing (figures 23 and 24).

Regarding claim 5, it is implicit in Koshikawa that the interface, comprising a spring and an air gap (figure 24) is less stiff than the primary air bearing material.

Regarding claim 6, Koshikawa discloses that the interface comprises a spring (154) connecting the primary air bearing to the secondary air bearing (figure 24).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 7 - 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshikawa et al. in view of U.S. Patent No. 6,069,769 to Dorius et al.

Regarding claim 7, Koshikawa discloses a slider (110) for supporting a transducing head (152b) proximate a rotating disc, the slider comprising a primary air bearing (surface in figure 23 except portion 152) having a disc opposing face bounded by a leading edge (near 117) and a trailing edge (near 151) wherein an air bearing surface is formed on a disc opposing face (figures 23 and 24); a secondary air bearing (152) having a disc opposing face bounded by a front edge and a back edge (figure 24), wherein the air bearing surface is defined on the disc opposing face (figures 23 – 25), the air bearing surface having a protrusion (figure 23) proximate the second trailing edge, wherein the transducing head (152b) is located on the protrusion (figure 23); and an interface (151a and 152a) connecting the secondary air bearing to the primary air bearing wherein the interface displaces the transducing head vertically with respect to the primary air bearing (column 15, lines 6 – 11). It is implicit that the HMS is maintained substantially constant as the slider flies above the disc, because the secondary air bearing is spring supported.

Koshikawa fails to disclose that the secondary air bearing has a pad and is bounded by the trailing edge.

Dorius discloses a slider having a secondary air bearing pad (503) wherein the transducing head is located on the pad, and the pad is bounded by the trailing edge (figure 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide on the slider of Koshikawa a trailing end pad, wherein the transducing head is located on the pad, as taught by Dorius. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide a trailing end pad, because a trailing pad helps counterbalance negative and positive pressure regions of the slider, so that the flying height variation is minimized and flattened (Dorius, column 5, line 61 – column 6, line 15).

Regarding claim 8, Koshikawa discloses that the interface substantially surrounds the secondary air bearing (figures 23 and 24).

Regarding claim 13, the transducer pad of Koshikawa as modified by Dorius is considered to modulate in response to local disc surface topography to maintain the HMS substantially constant, because the slider of Koshikawa uses a spring and actuation comb mechanism substantially similar to the applicant's disclosed invention. Thus, the transducer pad of Koshikawa is considered to move vertically based on air flow differences resulting from changes in local disc topography.

Regarding claim 14, Koshikawa discloses that the interface comprises a spring (154) connecting the primary air bearing to the secondary air bearing and a gap is formed between the primary and secondary air bearings (figure 24).

Regarding claim 15, Koshikawa discloses a first actuation comb (151a) attached to the primary air bearing (151) and lying within the gap; and a second actuation comb (152a) attached

to the secondary air bearing (152) and lying within the gap wherein the first and second actuation combs are interwoven (figure 24).

Regarding claim 16, Koshikawa discloses that the first and second actuation combs are electrostatic combs (column 1, lines 10 – 13, column 15, lines 17 – 22, and figure 14b).

Regarding claim 17, Koshikawa discloses a slider (110) for supporting a transducing head (152b) proximate a rotating disc, the slider having a disk opposing face bounded by a leading edge (near 117) and a trailing edge (near 151), the slider body having a longitudinal axis (y-axis in figure 23); an air bearing surface (figure 23) defined on the disc opposing face (figures 23 – 25), the air bearing surface having a protrusion (figure 23) proximate the second trailing edge, wherein the transducing head (152b) is located on the protrusion (figure 23); and an interface (151a and 152a) defined in the slider body and substantially surrounding the transducing head (figures 23 – 25) wherein the interface displaces the transducing head vertically with respect to the primary air bearing (column 15, lines 6 – 11). It is implicit that the HMS is maintained substantially constant as the slider flies above the disc, because the secondary air bearing is spring supported.

Koshikawa fails to disclose that the secondary air bearing has a pad.

Dorius discloses a slider having a secondary air bearing pad (503) wherein the transducing head is located on the pad (figure 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide on the slider of Koshikawa a trailing end pad, wherein the transducing head is located on the pad, as taught by Dorius for the reasons listed above, with respect to claim 7.

Regarding claims 9 and 18, it is implicit in Koshikawa that the interface, comprising a spring and an air gap (figure 24) is less stiff than the primary air bearing material.

Regarding claims 10 and 19, it is implicit in Koshikawa that the interface, comprising a spring, actuation combs, and an air gap is a different material than the primary and secondary air bearings material, which has no air gap. It is likewise implicit that the spring and air gap of the interface is less stiff than the solid slider material of the first and second air bearings.

Regarding claims 11 and 20, Koshikawa discloses that the interface (151, 152) has a first surface at the disc opposing face (figures 23 and 24) of the primary air bearing, and the slider further comprises at least one spring (154) etched into the first surface of the interface (figure 24).

6. Claims 12 and 21 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshikawa et al. in view of Dorius et al. as applied to claims 7 and 17 above, and further in view of U.S. Patent No. 5,943189 to Boutaghou et al.

Regarding claims 12 and 21, Koshikawa fails to disclose that the slider body has a first thickness and the interface has a second thickness, the first thickness being greater than the second thickness.

Boutaghou discloses a slider (24) with a first thickness and an interface (58) with a second thickness, wherein the first thickness is greater than the second thickness (figures 5 and 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the slider of Koshikawa as modified by Dorius, such that the slider body

thickness is greater than the interface thickness, as taught by Boutaghou. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide an interface which is less thick than the slider, so that the air bearing section with the transducer can more readily bend to vertically displace the transducer with respect to the recording medium surface (figures 5 and 6).

Regarding claim 22, Koshikawa discloses a slider (110) for supporting a transducing head (152b) proximate a rotating disc, the slider comprising a primary air bearing (surface in figure 23 except portion 152) having a disk opposing face bounded by a leading edge (near 117) and a trailing edge (near 151); a secondary air bearing (152) having a disc opposing face bounded by a front edge and a back edge (figure 24); an air bearing surface defined on the disc opposing faces of the primary and secondary air bearings (figures 23 and 24), the air bearing surface having a protrusion (figure 23) proximate the second trailing edge, wherein the transducing head (152b) is located on the protrusion (figure 23); and a spring (154) connecting the secondary air bearing to the primary air bearing wherein the spring displaces the transducing head vertically with respect to the primary air bearing (column 15, lines 6 – 11). It is implicit that the HMS is maintained substantially constant as the slider flies above the disc, because the secondary air bearing is spring supported.

Koshikawa fails to disclose that the secondary air bearing has a pad.

Dorius discloses a slider having a secondary air bearing pad (503) wherein the transducing head is located on the pad (figure 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide on the slider of Koshikawa a pad, wherein the transducing head is located

on the pad, as taught by Dorius. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide a pad, because a pad helps counterbalance negative and positive pressure regions of the slider, so that the flying height variation is minimized and flattened (Dorius, column 5, line 61 – column 6, line 15).

Koshikawa further fails to disclose that the primary air bearing is bounded by a rear edge, the secondary air bearing is bounded by a trailing edge; and the spring connects the front edge of the secondary air bearing to the rear edge of the primary air bearing.

Boutaghou discloses a slider wherein the primary air bearing bounded by a leading edge and a rear edge, a secondary air bearing bounded by a front edge and a trailing edge, and an interface connecting the front edge to the rear edge (figures 5 and 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the slider of Koshikawa as modified by Dorius so that the air bearings are bounded and the interface is located in the manner taught by Boutaghou. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide bounding rear and front edges, because the geometry of the device is simpler, and would thus require fewer manufacturing steps and less cost than the "floating" secondary air bearing of Koshikawa.

Regarding claim 23, Koshikawa discloses a first actuation comb (151a) attached to the primary air bearing (151) and lying within the gap; and a second actuation comb (152a) attached to the secondary air bearing (152) and lying within the gap wherein the first and second actuation combs are interwoven (figure 24).

Regarding claim 24, Koshikawa discloses that the first and second actuation combs are electrostatic combs (column 1, lines 10 – 13, column 15, lines 17 – 22, and figure 14b).

Response to Arguments

7. Applicant's arguments filed 8/13/02 have been fully considered but they are not persuasive.

Regarding claim 1, the Applicant argues that "the slider of Koshikawa et al. does not include a primary air bearing and a secondary air bearing. Movable section 152 of Koshikawa is not an air bearing, but rather is embedded in slider body and does not include a disc opposing surface. Furthermore, vertical movement of head element 152b does not occur in response to local disc surface topography, as required by claim 1. Rather, vertical movement of head element 152b occurs by an electrostatic attraction force acting on moveable section 152, resisting a force of support spring 154 (page 7 of Amdt. A)."

This argument is not persuasive, because Koshikawa does show that movable section 152 is an air bearing, and includes a disc opposing surface. Movable section 152 comprises an air bearing head section (152b) as well as an actuation comb (152a) embedded in the slider (column 15, lines 15 – 30; figure 24). Figures 23, 25, and 26 clearly show portions of the movable section 152 having a disc opposing surface and acting as an air bearing surface. Because movable member 152 is only connected to the slider main body through a spring (154) and the electrostatic forces from the actuation comb (151, 152a), it can move semi-independently of the main air bearing, and thus constitutes a secondary air bearing. It is further implicit in Koshikawa that vertical movement of the head element will occur in response to local disc surface

topography, as required by claim 1, because the secondary air bearing will be affected by the airflow over the disk, which is a direct result of the local disk surface topography. The head element is held in place by forces from the support spring and the electrostatic actuation comb, which is a configuration not dissimilar to that disclosed by the applicant in figure 11. The addition of forces due to the airflow over the secondary air bearing will cause the movable section 152 to move vertically in response to those forces.

Regarding claims 7 and 22, the Applicant argues that "the secondary air bearing having a disk opposing face is not taught by either prior art references. Furthermore, there is no suggestion or motivation to modify the teachings of either prior art references to include a secondary air bearing (pages 8 – 10, Amdt. A;).

This is not persuasive, because Koshikawa does disclose a secondary air bearing, as explained supra.

Regarding claim 17, the Applicant argues that "claim 17 requires the interface to substantially surround the transducing head, which is located on the pad. Koshikawa et al. Discloses parallel teeth 151a and 152a which the Examiner defines as an interface to displace the head element 152 vertically. However, teeth 151a and 152a do not substantially surround head element 152b. ... The parallel teeth 151a and 152a of Koshikawa et al. are embedded in slider 110 beneath the head element 152b (page 9, Amdt. A).

This is not persuasive, because it is implicit in Koshikawa that the parallel teeth 151a and 152a, which act as an interface to displace the head element vertically, must be symmetrically provided about the head element 152b, in order for the device to function properly. Figure 24 of Koshikawa only shows a quarter-sectional view of the interface. If the interface teeth were only

provided in that quarter section, then head element 152b could not be moved in a vertical direction, but rather would move in an angled fashion, thus causing the device not to function appropriately. Figures 16 and 21 further illustrate that it is proper and necessary for an actuation comb to be provided symmetrically about the component to be moved vertically. The additional argument of the Applicant that the parallel teeth of Koshikawa are embedded in the slider does not appear to negate the possibility of the teeth surrounding the head element. The teeth of Koshikawa are provided in the slider in a manner such that they are disposed around and outside of the portion of the slider at which the head element is disposed. Hence, the teeth are considered to 'substantially surround the transducing head.'

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (703) 305-3233. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (703) 305-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and same for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd
October 9, 2002

Carl Whitehead Jr.
CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800